



The Lost is Found

Giuseppe Piazzi (see “Dark and Starry Night”) observed a moving point of light, which was thought to be the “missing planet” (see “Celestial Police”) Ceres, during January and February of 1801. Unfortunately, he did not collect enough data to determine the object’s orbit before it disappeared. Was

Ceres lost? **William Herschel** and others searched for it, not realizing that because of its orbit, it would not be visible again until the early fall of 1801. Most of Piazzi’s colleagues feared that the object was permanently lost.



Carl Friedrich Gauss
in 1803

<http://www-gap.dcs.st-and.ac.uk/~history/PictDisplay/Gauss.html>

But **Carl Friedrich Gauss**, a young German mathematician, came to the rescue! He applied his new method of “determining the path of a celestial body without recourse to any hypothetical pre-suppositions from observations of relatively brief duration and thus precluding the application of specialized methods.” In other words, unlike all the known orbital calculation methods, Gauss didn’t have to decide before doing the calculations whether the orbit was spherical (round) or more parabolic (bowl-shaped). Instead, with surprising speed and accuracy, Gauss used the **geocentric** 3-degree arc that Piazzi had determined during his 41 days of observation to predict where the new “planet” should be found.

Imagine Gauss’s excitement as he wrote, “The initial application of this method was made in October 1801, and the first exciting night on which a search was made for the planet using the figures deduced from it—7th December 1801, by von Zach—brought the fugitive [Ceres] back under supervision.”

Actually, **Baron Francis Xavier von Zach** found four stars at that location on December 7, but when the weather cleared again on December 18, one of the stars was gone. Von Zach finally confirmed that he had recovered the missing object on January 1, 1802, exactly one year after Piazzi’s first sighting. Using the values that Gauss sent him, **Wilhelm Olbers**, an amateur astronomer in Bremen, also found Ceres with his own telescope.

Piazzi received a letter sent by the secretary of state on behalf of the king of Sicily, commending him on the discovery of Ceres. Instead of presenting Piazzi a medal, the king agreed to give the Palermo Observatory a new telescope.

Von Zach was gratified with the dual role he played in this exciting event. He not only found the missing Ceres, but also his publication, *Monthly Correspondence*, played a vital communication role in the recovery.

By 1809, Gauss had refined the mathematical procedure he used to determine Ceres orbit, and it became the standard procedure for orbital calculations.

The “missing planet” was found, lost, and found again. All’s well that ends well...except this was not the end! This was only the beginning! Many more asteroids had yet to be discovered. Remember the Dawn spacecraft is not traveling directly to Ceres, it will study Vesta first.

Additional Resources

Web Sites

<http://www-gap.dcs.st-and.ac.uk/~history/Mathematicians/Gauss.html>

This biography of Carl Friedrich Gauss contains information about the relationship of Gauss and Baron von Zach as well as details about the rediscovery of Ceres.

http://www.jpl.nasa.gov/solar_system/features/ceres.html

A NASA feature about a “Texas-Sized Space Rock” known as Ceres.

Print Resources

Cousins, F.W. (1972). *The solar system*. New York, NY: Pica Press.

Grunn, B. (1991). *The timetable of history – A horizontal linkage of people and events*. Simon & Schuster, Inc.

McSween, H.Y. (1999). *Meteorites and their parent planets*. Cambridge; NY: Cambridge University Press.

Peebles, C. (2000). *Asteroids: A history*. Washington, DC: Smithsonian Institution Press.

Roth, G.D. (1962). *The system of minor planet*. Princeton, NJ: Company Inc.

Schorn, R.A. (1988). *Planetary astronomy*. College Station, TX: Texas A&M University Press.